

WHAT IS CLAIMED IS:

1. A computer operated encoding system for producing an electronic security device image from one or more electronic source images, said security device image being adaptable for printing onto a document to secure said document against data alteration, said system comprising:

- (a) deflection encoding means comprising means for applying a selected software lens to one of said source images and producing a deflected image;
- (b) encryption encoding means comprising means for applying an encryption function to said deflected image or one of said source images and producing an encrypted image;
- (c) means for overlaying said deflected and encrypted images and producing therefrom said security device image,

whereby said deflected image may be detected from said security device image both by means of a manual lenticular lens corresponding to said software lens applied to a printing of said security image and by means of computer decoding processing applying said software lens and said encrypted image may be detected from said security device image solely by means of computer decoding processing applying a decryption function corresponding to said encryption function.

2. An encoding system according to claim 1 wherein said security device image includes a plurality of said deflected images, said deflected images being interlaced to form an

interlaced image and said interlaced image being overlaid with said encrypted image.

3. An encoding system according to claim 1 wherein said software lens is selected from the group comprising line lenses, curved lenses and bitmap lenses.

4. A computer operated decoding system for identifying one or more latent source images from a security device image comprising at least an encrypted image and a deflected image which are overlaid, said decoding system comprising:

- (a) means for separating said overlaid encrypted and deflected images;
- (b) decryption decoding means comprising means for applying to said encrypted image the decryption function corresponding to the encryption function used to produce said encrypted image and producing therefrom a decrypted image, said decrypted image corresponding either to one of said source images or a deflected image; and,
- (c) deflection decoding means comprising means for applying to said deflected image, or to said decrypted image if said decrypted image corresponds to a deflected image, a software lens corresponding to the software lens used to produce said deflected image and producing therefrom a deflection decoded image.

5. A decoding system according to claim 4 and further comprising means for aligning said software lens with said deflected image to identify whether one of said source images corresponds to said deflection decoded image.

6. A decoding system according to claim 5 wherein said aligning means comprises evaluation means for evaluating whether said deflection decoded image corresponds to said source image, wherein said evaluation means operates iteratively with said deflection decoding means to apply on each iteration either a different position of said software lens or other different lens parameter, until either said decoded image is determined to correspond to said source image or all available lens positions and/or parameters have been applied.

7. A decoding system according to claim 6 wherein said evaluation means uses a scoring algorithm to calculate a score based on pixel statistics calculated for each iteratively produced deflection decoded image.

8. A decoding system according to claim 7 wherein said deflection decoded image is determined to correspond to said source image when a relatively large change occurs in said score from one said iteration to the next.

9. A decoding system according to claim 8 and further

comprising means for outputting either said deflection decoded image when it has been determined to correspond to said source image or an error message if no such determination is made.

10. An image encoding method for producing an electronic security device image from one or more electronic source images whereby said security device image may be adapted for printing onto a document to secure said document against data alteration, said method comprising the steps:

- (a) applying a selected software lens to one of said source images and thereby producing a deflected image;
- (b) applying an encryption function to said deflected image or one of said source images and thereby producing an encrypted image;
- (c) overlaying said deflected and encrypted images and producing therefrom said security device image,

whereby said deflected image may be detected from said security device image both by means of a manual lenticular lens corresponding to said software lens applied to a printing of said security image and by means of computer decoding processing applying said software lens and said encrypted image may be detected from said security device image solely by means of computer decoding processing applying a decryption function corresponding to said encryption function.

11. An encoding method according to claim 10 whereby a

plurality of said deflected images are produced and interlaced to form an interlaced image and said interlaced image is overlaid with said encrypted image.

12. An encoding method according to claim 11 whereby said software lens is selected from the group comprising line lenses, curved lenses and bitmap lenses.

13. An image decoding method for identifying one or more latent source images from a security device image comprising at least an encrypted image and a deflected image which are overlaid, said method comprising the steps:

- (a) separating said overlaid encrypted and deflected images;
- (b) applying to said encrypted image the decryption function corresponding to the encryption function used to produce said encrypted image and producing therefrom a decrypted image, said decrypted image corresponding either to one of said source images or a deflected image; and,
- (c) applying to said deflected image, or to said decrypted image if said decrypted image corresponds to a deflected image, a software lens corresponding to the software lens used to produce said deflected image and producing therefrom a deflection decoded image.

14. A method according to claim 13 and further comprising the step of aligning said software lens with said deflected image to identify whether one of said source images corresponds to said deflection decoded image.

15. A method according to claim 14 wherein said aligning step comprises iteratively producing a deflection decoded image using either a different position of said software lens or other different lens parameter, until either said deflection decoded image is determined to correspond to said source image or all available lens positions and/or parameters have been applied.

16. A method according to claim 15 wherein a scoring algorithm is applied to calculate a score based on pixel statistics calculated for each iteratively produced deflection decoded image.

17. A method according to claim 16 whereby said deflection decoded image is determined to correspond to said source image when a relatively large change occurs in said score from one said iteration to the next.

18. A method according to claim 17 and further comprising the step of outputting either said deflection decoded image when it has been determined to correspond to said source image or an error message if no such determination is made.